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Dried Distillers Grains Supplementation to Yearling Cattle Grazing Smooth Bromegrass: Response and Performance Profile Summary

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Procedure

Data were summarized from four grazing experiments (*Nebraska Beef Cattle Reports*, 2004, pp. 25-27; 2006, pp. 27-29; 2007, pp. 12-14; and 2006 unpublished Nebraska data) where distillers grains were supplemented at 0.525% of BW to yearling cattle grazing smooth bromegrass. All four experiments were conducted on the same pastures at the Agricultural Research Development Center near Mead, Neb., from 2002 to 2006. Two of the experiments were with heifers and two were with steers. The length of trials ranged from 84 days to 156 days. Initial BW ranged from 650 lb to 811 lb. In each experiment cattle were rotationally grazed in six pastures per replication. Cattle were stocked at similar stocking rates (3.5 and 4.0 AUM/acre) and pastures were fertilized at similar rates across years (73 to 80 lb N/acre).

Cattle were limit fed a common diet for 5 days at the beginning and end of all the trials and weights were

measured for three consecutive days to minimize variation in gut fill. Diet collections were taken at representative time points throughout the grazing period via ruminally fistulated steers. Diet DM, CP and IVDMD were subsequently determined. Dried distillers grains ranged between 25% to 30% CP, and 10% to 12% EE for the four experiments.

Two of the four experiments were used to look at the response of yearling cattle to DDG supplementation over time. Interim weights were taken at the end of each of five grazing cycles (24 days in cycles 1 and 5, and 36 days in cycles 2, 3, and 4) within the grazing season. Six pastures were rotationally grazed within each cycle. All interim weights were analyzed on a shrunk (4%) basis.

Results

Diet samples collected from 2002 to 2006 are shown in Table 1. There was substantial year to year variation

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Summary

Four years of data were summarized to evaluate yearling performance on smooth bromegrass when supplemented with dried distillers grains (DDG). On average cattle were supplemented 0.525% of BW daily with DDG for the entire grazing period (84 to 156 days). Daily gains were increased 0.55 lb/day for the entire grazing season. Performance from the last two years of data show a quadratic decrease in ADG as grazing days increase and forage quality decreases for both the supplemented and nonsupplemented cattle. The response to DDG supplementation increases with increasing grazing days.

Introduction

Increases in feedlot ration costs have made pasture and grass programs for yearling beef cattle more attractive. Dried distillers grains are a good source of both undegradable protein and energy and have been shown to increase ADG in animals consuming low and high quality forages (2005 *Nebraska Beef Cattle Report*, pp. 18-20) with both the concentrated energy and undegradable protein contributing to the improvements in gain (2006 *Nebraska Beef Cattle Report*, pp. 27-29). The response of yearling cattle to DDG supplementation over time is unclear. The objective of our research was to summarize the overall response and performance profile of yearling cattle on smooth bromegrass supplemented with DDG.

Table 1. Forage quality of diet samples collected from 2002 to 2006.^a

Item	Year					Mean
	2002	2003 ^{bc}	2004 ^b	2005 ^{bc}	2006 ^{bc}	
CP, % DM						
April	—	—	—	18.5	18.1	18.3
May	19.9	25.3	20.7	19.2	14.7	20.0
June	15.1	13.3	20.8	14.9	12.1	15.2
July	—	20.4	21.4	14.9	11.0	16.9
Aug	—	—	—	17.6	16.8	17.2
Sept	—	—	—	17.6	16.6	17.1
Mean	17.5	19.7	21.0	17.1	14.9	18.0
IVDMD, %						
April	—	—	—	68.2	74.6	71.4
May	61.5	69.5	66.7	65.6	71.9	67.0
June	51.9	51.3	65.1	58.8	63.2	58.1
July	—	53.9	63.5	53.4	52.4	55.8
Aug	—	—	—	50.7	62.3	56.5
Sept	—	—	—	51.6	65.2	58.4
Mean	56.7	58.2	65.1	58.0	64.9	60.6

^aSteers were supplemented on average 0.525% of BW daily with DDG for the entire grazing period. DDG contained 25% to 30% CP, and 10% to 12% EE.

^bQuadratic effect of time for CP ($P < 0.05$).

^cQuadratic effect of time for IVDMD ($P < 0.05$).

which is expected because of inherent environmental fluctuations within and between years. In all years except 2002, which was limited by the number of samples taken, there was a quadratic effect ($P < 0.05$) of time for CP, ranging from an average high in May (20% CP) during the early growing period, to a low in the summer months of June and July (15% to 16%), and back up to intermediate levels (17% CP) in the late summer due to late season regrowth. Similar quadratic ($P < 0.05$) trends were seen in IVDMD from 71% early in the season to 56% in the middle of the summer and then to 59% at the end of the summer.

Mean BW of the yearlings at the start of the grazing season was 749 lb and ranged from 650 to 811 lb (Table 2). Daily gains of nonsupplemented cattle averaged 1.53 lb/day and ranged from 1.37 to 1.77 lb/day. The average supplementation level was 0.525% BW, which increased ADG by 0.55 lb/day to 2.08 lb/day (ranged 1.75 to 2.32 lb/day). The response in ADG for each 1% BW supplementation was 1.05 lb. This is slightly higher (1.05 lb vs. 0.99 and 0.95 lb) than the response reported in a larger summary (2007 Nebraska Beef Cattle Report, pp. 10-11) that included experiments from both cool and warm season grasses. Both of these summaries clearly show an added response greater than what is typically observed (0.3 lb/day) from supplementing with undegradable intake protein. This added response can be attributed to both the concentrated energy and undegradable protein found in the DG (2006 Nebraska Beef Cattle Report, pp. 27-29).

Interim performance from the last two years of data show a quadratic decrease in cumulative ADG ($P < 0.01$) for both the supplemented and nonsupplemented cattle over the entire grazing period (Figure 1). The overall decrease in ADG through the grazing period is indicative of the diet quality. Digestibility of cool season grasses generally declines on the order of 0.25% to 0.50% per d

Table 2. Response of yearling steers grazing smooth bromegrass to dried distillers grains supplementation.

Experiment	BW	CONT ADG	SUPP ADG	%BW Supp	Response/ 1% BW supp
NEBR '04 ^a	650	1.50 ^b	1.75 ^c	0.50	0.50
NEBR '06 ^a	811	1.48 ^d	2.32 ^e	0.50	1.68
NEBR '07 ^a	767	1.37 ^d	1.95 ^e	0.55	1.05
Unpub ^f	766	1.77 ^d	2.30 ^e	0.55	0.96
Mean	749	1.53	2.08	0.53	1.05

^aNebraska Beef Reports 2004, 2006, and 2007 data collected in years 2002, 2004, and 2005, respectively.

^bcMeans without a common superscript differ ($P < 0.05$).

^deMeans without a common superscript differ ($P < 0.01$).

^fUnpublished. University of Nebraska-Lincoln, 2006 data.

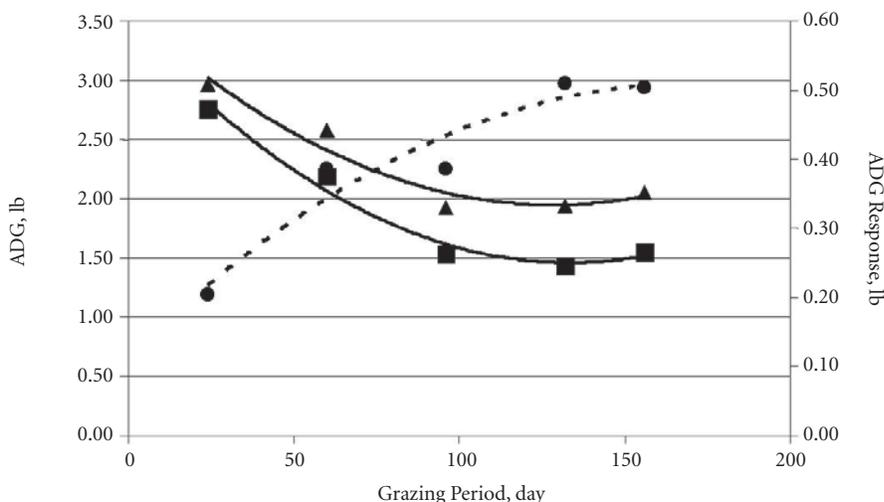


Figure 1. Growth profile for steers grazing smooth bromegrass and supplemented with dried distillers grains. The quadratic decrease in cumulative ADG ($P < 0.01$) for both the supplemented (—▲; $y = 0.0001x^2 - 0.0254x + 3.5743$; $R^2 = 0.94$) and nonsupplemented (—■; $y = 0.0001x^2 - 0.03x + 3.4617$; $R^2 = 0.98$) cattle is expressed over the entire grazing period. The ADG response (----●) of the supplemented cattle over the controls increases as grazing days increase. The quadratic ($y = -0.00005x^2 + 0.0046x + 0.1138$; $R^2 = 0.9235$) response is inversely related to diet quality.

until it reaches a low of 50% to 55%. However, because of the characteristic regrowth that is often observed in the later portion of the grazing season, a quadratic response is often observed in digestibility and ADG tends to respond accordingly. The ADG response of the supplemented cattle over the controls increased as grazing days were increased. This quadratic response appears to be inversely related to the decrease in diet quality. This is possibly due to a protein response to DDG supplementation early in the grazing period when forage quality is relatively high and an energy response as forage quality diminishes.

Supplementing yearling cattle on smooth bromegrass with DDG is an effective way to increase weight gain. It appears that even though daily gain is decreasing through most of the grazing period, as forage quality also decreases, the response to supplementation increases compared to non-supplemented cattle and this weight is maintained for the remainder of the grazing period.

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